## REMARKS

Claims 1 – 20 were pending in this application.

Claims 1 - 20 were rejected.

Claims 1, 4, 5, 6, and 13-16 were amended.

Claims 7, 12 and 18-20 were cancelled.

**I. 35 USC 103(a) Rejections**

**Claims 1, 4 and 7-10 were rejected under 35 USC 103(a) as being unpatentable in view of U.S. Patent No. 6,081,739 to Lemchen in view of U.S. Patent Application No. 2001/0002310 to Chishti.**

Claim 1 is an independent claim that sets forth a method of creating a digital computer model of the craniofacial features of a person. According to the methodology of Claim 1, a person's external facial features are scanned to create a model grid. Furthermore, that person's external facial features are also photographed to obtain photo images of the external facial features. Once a model grid and photo images of the external facial features are obtained, the two-dimensional photo images are integrated onto the three-dimensional model grid. This creates a first computer model of the person's external facial features.

The first computer model shows exterior facial features. It does not show details of the teeth.. In order to model the teeth, a physical model of the person's teeth is first produced. The physical model of the teeth is then scanned. A second computer model is therefore created that models the person's teeth.

The first computer model of the external facial features and the second computer model of the teeth are then integrated into a master computer model. This master model accurately models a person's external facial features as well as their teeth. Consequently, using the master model, the physical effect of changes to the teeth can be modeled on the external facial features. Thus, changes in external appearance caused by changes in the teeth can be accurately modeled.

**The Lemchen patent** discloses an imaging machine that is used to create a digital model

of a person's head. The Lemchen imaging machine requires that a person stand in front of the imaging machine. The imaging machine then takes an X-ray of scan of the head and a laser scan of the exterior features. The X-ray scan discloses bone structure. The laser scan discloses exterior features. The data of the two scans are then combined to model the relationship of bone structure to exterior features.

Although the Lemchen patent does produce a digital model of a person's head, both the model that is created and the way that model is created differ greatly from that of the present invention.

The purpose of the present invention is to create a modeling system that allows doctors and patients to accurately determine how changes to the teeth will effect the outward appearance of a person. This method cannot be achieved by the Lemchen patent.

In the present invention method, an accurate model of a person's external appearance must be created. This is done by scanning the patient to create a three-dimensional model grid. Photo images of the actual appearance of the person are then superimposed over the three-dimensional model grid. The result is a first computer model that accurately models the external appearance of the person.

In the Lemchen patent, the shape of a person's face is scanned to create a three-dimensional model grid. However, the Lemchen patent makes no disclosure of integrating photo images onto the model grid to create a model of accurate external appearance. Since the Lemchen patent does not create a model of actual external appearance, the Lemchen patent cannot model changes in actual appearance caused by dental work. Thus, the Lemchen patent cannot accomplish the intended purpose of the present invention method.

Furthermore, in the present invention method of Claim 1, it is specifically claimed that a physical model of the patient's teeth is made. That physical model is then scanned to create a highly accurate computer model of the teeth. This model of the teeth is then integrated with the first computer model of external appearance to create a master model. Since the master model accurately models the teeth and external appearance, changes to external appearance can be

extrapolated from changes to the teeth.

In the Lemchen patent, there is no disclosure of the method of physically modeling the teeth, creating a computer model by scanning the physical model or integrating the computer model of the teeth with the computer model of external appearance.

To address the deficiencies of the Lemchen patent, the Examiner combines the Lemchen patent with U.S. Patent Application Publication No. 2001/0002310 to Chishti. The Chishti reference shows a system that creates a computer model of the teeth. The Chishti reference makes no disclosure whatsoever of modeling how changes to the teeth will effect a person's external appearance. Rather, the Chishti disclosure is limited to only changes in the teeth.

Consequently, **in combination, the Lemchen patent and the Chishti** patent fail to disclose the step of creating a first model of a person's external features by superimposing photo images onto a three-dimensional model grid. Furthermore, the Lemchen patent and the Chishti reference fail to disclose the step of integrating a computer model of a person's external appearance with a computer model of the teeth for the purpose of predicting changes in external appearance caused by change to the teeth.

Since this matter is specifically set forth in Claim 1 and is not disclosed by the cited references, it is clear that the cited references fail to disclose or suggest the matter of Claim 1 or its dependent claims. The Examiner is therefore requested to withdraw the 35 USC 103 rejections as applied to Claim 1 and its dependent claims.

**In regard to Claim 9**, the combination of the Lemchen patent and the Chishti patent do not disclose of suggest the combined steps of:

scanning the patient's head while biting the bite jig to create a first collection of data points;

coupling said physical model of said teeth to said bite jig in a subassembly; and

scanning said subassembly to create a second collection of data

points.

Rather, in the Lemchen patent, a bite plate is used to hold the head still during a scan. No disclosure is made of scanning the bite plate to obtain reference points that are used to orient the computer model of a person's teeth.

**The Examiner has rejected Claims 2, 3 and 11-18 under 35 USC 103(a) 35 USC 103(a) as being unpatentable in view of U.S. Patent No. 6,081,739 to Lemchen in view of U.S. Patent App. Publication No. 2001/0002310 to Chishti, and in further view of U.S. Patent App Publication No. 2001/0027271 to Franck .**

Claims 2, 3 and 11 depend from Claim 1. Claim 1 is distinguishable over the Lemchen and Chishti references for reasons previously stated.

The Franck patent discloses a system for scanning markers implanted on a person's skull for the purpose of orienting instruments used in stereotactic surgery. The Franck patent does not disclose anything about combining computer models of the teeth and external features to predict changes in external features caused by changes to the teeth. As such, the Franck patent does not address the deficiencies of the Lemchen and Chishti references as applied to Claim 1 and its dependent claims.

Claim 13

Claims 13 is an independent claim. Claims 14-17 depend from Claim 13.

Claim 13 sets forth a method for creating a three-dimensional computer model of a person's craniofacial features. The method includes providing a first set of reference points on at least some of a person's external facial features. The person's external facial features are then scanned to create a first computer model of the person's external facial features that includes the first set of reference points. A second computer model is then produced of that person's teeth.

A bite plate is provided that has a second set of reference points on it. The bite plate is

held in the person's teeth, wherein the second set of reference points protrude from the person's mouth. The person is scanned while the bite plate is in the mouth. This produces a reference scan that includes both the first set of reference points and the second set of reference points.

The first computer model of the external features and the second computer model of the teeth are integrated into a master computer model utilizing the first set of reference points and the second set of reference points in the reference scan.

**The Lemchen patent, the Chishti patent and the Franck patent** all fail to disclose or suggest the scanning of any bite plate with reference points that extend outside the mouth. Furthermore, the combined reference fail to disclose or suggest the use of any such reference scan to orient a model of teeth with a model of external facial features.

Since this matter is specifically set forth in Claim 13 and is not disclosed by the cited references, it is clear that the cited references fail to disclose or suggest the matter of Claim 13 or its dependent claims. The Examiner is therefore requested to withdraw the 35 USC 103 rejections as applied to Claim 13 and its dependent claims.

**The Examiner has rejected Claims 5, 6 under 35 USC 103(a) as being unpatentable in view of U.S. Patent No. 6,081,739 to Lemchen in view of U.S. Patent App. Publication No. 2001/0002310 to Chishti, and in further view of U.S. Patent No. 5,882,193 to Bergerson.**

Claims 5 and 6 depend from independent Claim 1. Claim 1 is distinguishable over the Lemchen and Christi references for the reasons previously stated.

The Bergerson patent discloses an automated system for diagnosing an orthodontic appliance. In the Bergersen patent, a person sits in front of a camera so that pictures can be taken of the patient's teeth.

Like the Lemchen and Christi references, the Bergerson patent makes no disclosure concerning the step of creating a first model of a person's external features by superimposing photo images onto a three-dimensional model grid. Furthermore, the combined references fail to

disclose the step of integrating a computer model of a person's external appearance with a computer model of the teeth for the purpose of predicting changes in external appearance caused by change to the teeth.

Since this matter is specifically set forth in Claim 1 and is not disclosed by the cited references, it is clear that the cited references fail to disclose or suggest the matter of Claim 1 or its dependent claims. The Examiner is therefore requested to withdraw the 35 USC 103 rejections as applied to Claims 5 and 6 and its dependent claims.

Hindsight

The Examiner's rejection based upon the cited references requires a selective combination of various elements before the references can be applied to the pending claims. The law is clear. When prior art references require selective combination to render the claims of an application obvious, there must be some reason for the combination other than hindsight gleaned from the invention itself. See *Interconnect Planning Corp. v. Feil 774 F.2nd 1138, 227 USPQ 543 (Fed Cir 1985), and Ashland Oil, Inc. 776 F.2nd 281, 227 USPQ 657 (Fed Cir 1985).* Something in the prior art as a whole must suggest the desirability and thus the obviousness of making the combination. See *Lindermann Maschinenfabik GmbH v. American Hoist and Derrick Co. 730 F.2nd 1452, 221 USPQ 481 (Fed Cir. 1984), and Uniroyal Inc. v. Rudkin-Wiley Corp. 5 USPQ 2nd 1434 (1988).*

As the court stated in *Uniroyal, 837 F.2nd at 1051, 5 USPQ2nd at 1438*, "it is impermissible to use the claims as a frame and the prior art references as a mosaic to piece together a facsimile of the claimed invention." In regard to the matter set forth above, some hindsight does appear to be occurring. Yes, the Bergersen patent shows the use of digital cameras to photograph teeth. However, there is no suggestion that digital photos should be superimposed on a scanned model grid to create an accurate model of a person's external facial features. Yes, the Chishti patent shows the modeling of teeth. However, the Chishti patent does not suggest integrating the model of the teeth into a master model that includes accurate external features. Since nothing in the cited art suggests what the method of modeling being claimed, or even the

purpose of the model, some of the Examiner's combination are believed to be gleaned from the claimed application itself.

Accordingly, should the Examiner repeat any rejection, the applicant respectfully requests that a clearer motivation for the combined references be defined.

## II. DRAWINGS

The Official Draftsman's objections to the drawings have been noted. Formal drawings will be filed upon receipt of the Notice of Allowance for this application.

## III. SUMMARY

Having fully distinguished the pending claims over the cited art, this application is believed to stand in condition for allowance. However, if the Examiner is of the opinion that such action cannot be taken, the Examiner is requested to call the applicant's attorney at (215) 321-6772 in order that any outstanding issues may be resolved without the necessity of issuing a further Office Action.

Respectfully Submitted,

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